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Insects and mites on alfalfa in Alberta

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Insects and mites on alfalfa in Alberta

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SUMMARY

Four hundred and thirty-seven species of insects and nine species of mites have been collected from alfalfa grown in Alberta. The species are in 10 orders and 88 families. A number of the insects are pests of alfalfa or potential pests and many are predators or parasites. The significance of many of the insects has not been determined, nor have their interrelationships within the alfalfa ecosystem.

RÉSUMÉ

Quatre cent trente-sept espèces d'insectes et neuf d'espèces d'acariens ont été prélevés de champs de luzerne cultivés en Alberta. Les espèces font partie de 10 ordres et de 88 familles. Un certain nombre des insectes sont des ravageurs de la luzerne ou pourraient l'être et beaucoup sont des prédateurs ou des parasites. Le degré d'infestation de bon nombre de ces insectes reste à été déterminer, de même leur rôle dans l'écosystème de la luzerne.

INTRODUCTION

There are 2.9 million hectares of alfalfa and alfalfa-grass hay grown in Canada, of which the province of Alberta produces about 25%. Although cultivated forage is produced on less than 25% of the forage land base, it accounts for 70% of the feed supply. Alfalfa is the most important and widely grown legume in Canada and is extremely important as an inexpensive plant protein source for beef and milk production. Losses due to insects could severely disrupt the forage-livestock system, especially in southern Alberta where alfalfa is produced on high-value irrigated land.

There is limited knowledge about alfalfa insects in Alberta. Studies have been conducted on *Adelphocoris* (Lilly and Hobbs 1956), aphids (Harper and Kaldy 1982, Harper and Lilly 1966), bumble bees (Hobbs 1950), chemical control (Harper 1978), insect transmission of disease (Huang et al. 1983, Harper and Huang 1984), lygus (Salt 1945) and leafcutter bees (Hobbs and Lilly 1954, Hobbs 1968). Craig (1973) and Harper (1981) published papers on alfalfa insect pests of the Canadian prairies. Information on the importance or relationships of some of the species has been obtained from Bierne (1971, 1972), Borrer and DeLong (1963), Essig (1947), Fluke (1929), Hodek (1973), Pimental and Wheeler (1973), and Stary (1974).

This paper lists insects that have been found on alfalfa in Alberta and indicates the significance of the species that appear important to the crop. The insects were collected by sweep net, suction sampler, or by pitfall traps in the interior of alfalfa fields.

INSECTS IN ALFALFA

Collembola - Springtails

Poduridae

Hypogastrura manubrialis (Tullberg)

Sminthuridae

Bourletiella hortensis (Fitch)

Deuterosminthurus repandus (Agren.)

Sminthurinus elegans (Fitch)

Sminthurinus medialis (Mills)

The Collembola appear to be of little importance in alfalfa. Species in the family Poduridae, and the garden springtail, *B. hortensis*, may feed on seedlings of a wide variety of crops. *D. repandus* feeds on pollen.

Orthoptera - Grasshoppers and crickets

Acrididae

Camnula pellucida (Scudder)

Melanoplus bivittatus (Say)

Melanoplus femur-rubrum (DeGeer)

Melanoplus packardii Scudder

Melanoplus sanguinipes (Fabricius)

Tettigoniidae

Anabrus simplex Haldeman

The grasshoppers are sometimes of considerable importance as pests of alfalfa. They can chew off the flowers and pods, greatly lower seed yields and severely reduce hay yields. Grasshoppers most often cause serious damage to irrigated alfalfa where the fields of alfalfa border a dryland area. As the dryland grain or grass matures and becomes undesirable for food, the grasshoppers may move in large numbers to the green alfalfa.

The mormon cricket, *A. simplex*, feeds on plants but has not caused any serious damage to alfalfa in Alberta.

Thysanoptera - Thrips

Aeolothripidae

Aeolothrips fasciatus (Linnaeus)

Chirothripidae

Chirothrips manicatus Haliday

Chirothrips nr *productus*

Phleothripidae

Halothrips malifloris complex

Thripidae

Frankliniella occidentalis (Pergande)
Frankliniella tritici (Fitch) (*mountonii* Hood)
Limothrips denticornis Haliday
Odontothrips loti (Haliday)
Thrips tabaci Lindeman

A. fasciatus is a very common and important predator in alfalfa and feeds mainly on pest thrips and mites. *F. occidentalis* has been reported to be a predator of alfalfa weevil eggs. *T. tabaci* feeds mainly on onions and *L. denticornis* feeds mainly on grasses and small grains. They do not appear to be important in alfalfa. *O. loti*, *F. occidentalis* and *F. tritici* are the common pest thrips found on alfalfa.

Hemiptera - True bugs

Anthocoridae

Anthocoris antevolens White
Orius tristicolor (White)
Xylocoris umbrinus Van Duzee

Miridae

Adelphocoris lineolatus (Goeze)
Adelphocoris rapidus (Say)
Adelphocoris superbus (Uhler)
Atomoscelis modestus (Van Duzee)
Capsus simulans (Stal)
Chlamydatus pulicarius (Fallen)
Chlamydatus pullus (Reuter)
Corizus sp.
Deraeocoris brevis (Uhler)
Deraeocoris histrio (Reuter)
Hadronema militaris Uhler
Ilnacora nr *albifrons* Knight
Labops hesperus Uhler
Labops simulans Stal
Litomeris debilis (Uhler)
Lopidea dakota Knight
Lopus sp.
Lygidea sp.
Lygus borealis (Kelton)
Lygus desertinus Knight
Lygus elisus Van Duzee
Lygus lineolaris (Palisot de Beauvois)
Lygus rufidorsus (Kelton)
Lygus shulli (Knight)
Lygus unctuosus Kelton
Melanotrichus coagulatus (Uhler)
Melanotrichus flavosparsus (Sahlberg)
Mimoceps insignis Uhler
Orectoderus obliquus Uhler
Orthotylus fusicornis Knight

Phytocoris pallidicornis Reuter
Plagiognathus obscurus Uhler
Plagniognathus sp.
Polymerus prob. *rufipes* Knight
Slaterocoris prob. *stygicus* Say
Stenodema trispinosa (Reuter)
Stenodema vicinum (Provancher)
Stenodema virens Linnaeus
Trigonotylus coelestialium (Kirkaldy)
Trigonotylus ruficornis (Geoffroy)
Xylocoris umbrinus (Van Duzee)

Phymatidae

Phymata pennsylvanica Handl.

Reduviidae

Sinea diadema Fabricius

Nabidae

Dolichonabis propinguus (Reuter)
Nabis alternatus Parshley
Nabis limbatus Dahlbom
Nabis subcoleoptratus (Kirby)
Nabis van duzee Kirk

Tingidae

Acalypta nyctalis Drake
Corythucha coryli O. and D.

Piesmidae

Piesma cinerea Say

Lygaeidae

Cymus luridus Stal
Emblethis vicarius Horvath
Geocoris atricolor Mont.
Geocoris bullatus Say
Geocoris discopterus (Stal)
Geocoris nr pallens
Geocoris uliginosis Say
Ligyrocoris sylvestris (Linnaeus)
Lygaeus kalmii Stal
Nysius ericae Schilling
Nysius minutus Uhler
Peritrichus saskatchewanensis Barb.
Slaterobius insignis (Uhler)
Sphragisticus nebulosus (Fall.)
Zeridoneus costalis Van Duzee

Coreidae

Alydus conspersus (Montandon)
Alydus eurinus Say
Coriomerus humulis Uhler
Megalotamus quinquespinosus Say
Rhopalus crassicornis (Linnaeus)
Stictopleuris punctiventris (Dallas)
Stictopleuris viridicatus (Uhler)

Corizidae

Coriza sp.

Saldidae

Saldula palustris (Douglas)

Cydnidae

Corimelaena pulicaria (Germ)
Sehirus cinctus (Palisot de Beauvois)

Scutelleridae

Holcostethus limbolarius Stal
Homaemus aeneifrons consors Uhler

Pentatomidae

Carpocoris remotus Horvath
Codophila remotus (How.)
Coenus delius (Say)
Cosmopepla bimaculata Thomas
Neottiglossa undata Say
Podisus placidus Uhler
Sciocoris microphthalmus Flor.
Thyanta punctiventris Van Duzee

The anthocorid, *O. tristicolor*, is the most common predator in alfalfa. It feeds on aphids, mites, thrips, and small lepidoptera. *A. antevolens* feeds on similar prey but is only important in localized areas near trees. It is one of the important predators of *Pemphigus* gall aphids on *Populus* sp.

The mirids *D. histrio*, *D. brevis*, and *P. pallidicornis* are predators but are not very common in alfalfa so are probably of limited importance. Kelton (1980) also indicated that *O. obliquus* was probably predaceous. Most of the other species appear to be plant feeders. *A. lineolatus* and the *Lygus* spp. are major pests of alfalfa, especially seed alfalfa. Lilly (1958) showed that *Lygus* spp. can be predatory on aphids.

Chlamydatus, *Labops*, *Stenodema* and *Trigonotylus* species are commonly found in alfalfa but appear to prefer grasses and small grains.

The phymatid *P. pennsylvanica* and the reduviid *S. diadema* are both general predators of pests as well as honeybees and other beneficial insects.

The nabids are all predators of aphids, leafhoppers, and other small insects, and lepidopteran eggs and larvae. *N. alternatus* is the most common nabid predator as it can be found in nearly every alfalfa field and is important as a control agent of the pea aphid, *A. pisum*.

The tingids, piesmids and coreids are plant feeders but are not common in alfalfa.

The lygaeid *N. ericae*, the false chinch bug, is commonly found on alfalfa. It is of little importance on that crop but can be important on small grains. *P. saskatchewanensis* feeds on alfalfa and can be readily found in most fields but only occasionally causes much damage to the crop.

All the species of geocorids listed are predatory. *G. bullatus* is the most common geocorid found in alfalfa.

The saldid *S. palustris* is reported to be a predator of aquatic and semi-aquatic mites and insects.

Some species of the pentatomid genus *Podisus* are predators of hairless lepidoptera.

Homoptera

Membracidae

Campylenchia latipes Say
Stictocephala basalis (Walker)
Stictocephala bisonia (Kopp and Yke)

Cicadellidae

Aceratagallia arida Oman
Aceratagallia sanguinolenta (Provancher)
Acinopterus viridis Ball
Agallia quadripunctata (Provancher)
Agalliopsis ancistra Oman
Ambysellus grex (Oman)
Amplicephalus (Endria) *inimica* (Say)
Aphrodes bicinctus (Schrink)
Athysanella sp.
Auridius auratus (Gillette and Baker)
Chlorotettix unicolor (Fitch)
Colladonus geminatus (Van Duzee)
Colladonus montanus (Van Duzee)
Deltocephalus lineatifrons Oman
Diploceles (Verdanus) *evansi* (Ashmead)
Dorycephalus platyrhynchus Osb.
Draeculacephala novaeboracensis (Fitch)
Empoasca (Kyboasca) *bipunctata* (Osb.)
Euscelidius maculipennis (DeL. and Dav.) (=schenki Kirsch)
Extrusanus extrusus (Van Duzee)
Gyponana quebecensis (Provancher)
Hecalus major (Osb.)
Helocharis communis Fitch

Macrosteles fascifrons (Stål)
Prairiana cinerea (Uhler)
Psammotettix lividellus (Zett.)
Sorhoanus uhleri (Oman)
Streptanus deceptus (Sd. and DeLong)

Cercopidae

Philaenarcys bilineata (Say)
Philaenus spumarius (Linnaeus)

Delphacidae

Laccocera vittipennis Van Duzee
Liburna ocellusa Van Duzee
Liburna pellucida Fabricius
Liburna sp.

Aphididae

Acyrthosiphon pisum (Harris)
Nearctaphis bakeri (Cowen)
Theroaphis maculata (Buckton)

Psyllidae

Aphalara sp.
Livia sp.
Psylla sp.

The membracids, cicadellids, cercopids, and delphacids are readily found in alfalfa but do not appear to cause any serious damage to the crop. The cicadellids *A. sanguinolenta*, *C. montanus* and *M. fascifrons* are often present in alfalfa in very large numbers.

The pea aphid, *A. pisum*, has been a major pest of alfalfa, especially in the irrigated areas. It is generally kept under control by early cutting of the crop and by predators and parasites. Populations of both *N. bakeri* and *T. maculata*, the spotted alfalfa aphid, have remained low. *T. maculata* was found for the first time in Alberta in 1981 and may not have had time to become well established. However, it has been a major pest of alfalfa in the southern United States, Australia and New Zealand and could become a serious pest in Alberta as it injects a toxin into the alfalfa as well as damages the plant by its feeding.

Neuroptera

Chrysopidae

Chrysopa carnea Stephens (= *plorobunda* Fitch)
Chrysopa oculata Say

Chrysopa sp. are predaceous on aphids, mites, leafhoppers, psyllids and small lepidoptera. In alfalfa both the above species are common predators of the pea aphid.

Lepidoptera

Noctuidae

Agrotis orthogonia Morrison
Anagrapha (=*Autographa*) *falcifera* (Kirby)
Autographa californica (Speyer)
Discestra (=*Scotogramma*) *trifolii* (Hufnagel)
Euxoa auxiliaris (Grote)
Euxoa ochrogaster (Guenee)

Pieridae

Colias eurytheme Boisduval

Pyralidae

Loxostege cerealis (Zeller)
Loxostege sticticalis (Linnaeus)

The alfalfa looper, *A. californica*, and the alfalfa caterpillar, *C. eurytheme*, are found regularly in alfalfa but have as yet not caused serious problems. Larvae often have a high incidence of disease or parasitism. However, *A. californica* has at times seriously damaged canola in the province. The cutworms *A. orthogonia*, *E. auxiliaris*, *E. ochrogaster* and *D. trifolii* sometimes damage alfalfa but can only be considered to be minor pests. Established alfalfa sometimes harbors high populations of cutworms with no apparent effect. However, seedling alfalfa is sometimes severely affected. *L. sticticalis*, the sugarbeet webworm, is a major pest of sugarbeets in Alberta. Although it and *L. cerealis*, the alfalfa webworm, are commonly present in alfalfa they do not appear to have caused any serious damage.

Coleoptera

Carabidae

Agonum corvus (LeConte)
Agonum placidum (Say)
Amara apricaria (Paykull)
Amara carinata (LeConte)
Amara farcta LeConte
Amara lacustris LeConte
Amara littoralis Mannerheim
Amara obesa (Say)
Amara quenseli (Schonherr)
Amara torrida (Panzer)
Axinopalpus biplagiatus (Dejean)
Bembidion bimaculatum (Kirby)
Bembidion coloradense Hayward
Bembidion mutatum Gemminger and Harold
Bembidion nitidum (Kirby)
Bembidion obscurellum (Motschulsky)
Bembidion praecinctum LeConte
Bembidion quadrimaculatum (Linnaeus)

Bembidion rupicola (Kirby)
Bembidion nr *versicolor* (LeConte)
Bradyellus congener (LeConte)
Bradyellus nigerrimus Lindroth
Calosoma osoletum Say
Harpalellus basilaris (Kirby)
Harpalus amputatus Say
Harpalus fumerarius Csiki
Harpalus nr *uteanus* Casey
Harpalus sp.
Loricera pilicornis (Fabricius)
Metabletus americanus (Dejean)
Microlestes linearis (LeConte)
Notiophilus aquaticus (Linneaus)
Poecilus lucublandus (Say)
Pterostichus melanarius (Illiger)
Stenolophus comma (Fabricius)
Stenolophus conjunctus (Say)

Hydrophilidae

Helophorus orientalis Motsch.

Staphylinidae

Aleochara nr *bimaculata* (Grav.)
Anotylus sobrinus (LeConte)
Gabrius picipennis (Mannh.)
Gnypeta sp.
Leptacinus intermedius Don
Neohypnus hamatus (Say)
Neohypnus obscurus (Er.)
Philonthus concinnus (Grav.)
Philonthus fuscipennis Mannh.
Philonthus laetus Csny.
Philonthus occidentalis Horn
Philonthus sordidus (Grav.)
Philonthus varius (Gyllenhal)
Platystethus americanus Er.
Stenus (Hypostenus) reconditus breviusculus Puthz
Stenus (s.st.) morio Grav.
Stenus (s.st.) occidentalis Csny ?
Stenus vicinoides Puthz
Tachyporus inornatus Campbell
Tachyporus mexicanus Sharp
Tachyporus nitidulus (Fabricius)

Silphidae

Aclypea bituberosa (LeConte)

Histeridae

Euspilotus insertus (LeConte)

Scarabaeidae

Aphodius (?) *albertanus* Brown
Aphodius alternatus Horn
Aphodius granarius (Linneaus)
Aphodius pinguis Hald.
Onthophagus nuchicornis Linnaeus

Eucinetidae

Eucinetus terminalis LeConte

Elateridae

Aeolus mellillus (Say)
Agriotes criddelei Van Dyke
Ctenicera pudica (Brown)
Dalopius pallidus Brown
Hemicrepidius memnonius (Hbst.)
Hypolithus bicolor Esch.
Oedostethus femoralis LeConte

Cantharidae

Cantharis oregonus LeConte
Cantharis sp.

Lampyridae

Ellychnia corrusca (Linnaeus)
Ellychnia lacustris LeConte

Dermestidae

Dermestes sp.

Anobiidae

Caenocara scymnoides LeConte
Xylentinus fucatus LeConte

Cleridae

Phyllobaenus sp.
Trichodes nutalli Kirby

Melyridae

Collops bipunctatus Say
Collops hirtellus LeConte
Collops vittatus Say
Malachius aeneus (Linnaeus)

Meloidae

Epicauta ferruginea (Say)
Epicauta maculata (Say)
Epicauta normalis Werner

Epicauta oregonae Horn
Epicauta pensylvanica (DeGeer)
Epicauta puncticollis Mann
Epicauta subglabra (Fall.)
Lytta nuttali Say

Mordellidae

Mordellistena sp.

Tenebrionidae

Blastinus sp.

Anthicidae

Anthicus flavicans LeConte
Anthicus hastatus Casey
Anthicus lutulentus Casey
Anthicus punctulatus LeConte
Notoxus anchora Hentz

Nitulidae

Epuraea sp.

Helodidae

Cyphon variabilis Thunb.

Cryptophagidae

Anchicera sp.
Cryptophagus acutangulus Gyllenhal

Coccinillidae

Adalia bipunctata (Linnaeus)
Adalia frigida (Schneider)
Brumoides septentrionis Weise
Coccinella novemnotata Herbst
Coccinella transversoguttata richardsoni Brown
Coccinella trifasciata perplexa Mulsant
Hippodamia caseyi Johnson
Hippodamia convergens Guerin
Hippodamia glacialis (Fabricius)
Hippodamia parenthesis (Say)
Hippodamia quinquesignata (Kirby)
Hippodamia sinuata crotchi Casey
Hippodamia tredecimpunctata tibialis (Say)
Hyperaspidius vittigerus (LeConte)
Hyperaspis inflexa Casey
Hyperaspis lateralis Mulsant
Hyperaspis quadrivittata LeConte
Hyperaspis undulata (Say)
Scymnus (Pullus) caudalis LeConte

Scymnus (Pullus) postpictus Casey
Scymnus (Pullus) puncticollis LeConte
Scymnus sp.

Phalacridae

Phalacrus sp.
Stillbus apicalis Melsheimer
Stillbus sp.

Lathridiidae

Corticarina sp.
Enicmus mimus Fall.
Melanophthalma sp.

Cerambycidae

Crossidius pullchelus LeConte
Tetraopes femoratus LeConte

Chrysomelidae

Altica sp.
Calligrapha californica coreopsivora Brown
Chaetocnema protensa LeConte
Chaetocnema sp.
Chrysolina sp.
Crepidodera nana (Say)
Disonycha latifrons Schaeffer
Disonycha triangularis (Say)
Entomoscelis americana Brown
Galeruca browni Blake ?
Gastrophysa cyanea Melsheimer
Gastrophysa polygoni (Linnaeus)
Leptinotarsa decemlineata (Say)
Longitarsus sp.
Macrohaltica sp.
Microrhophala vittata (Fabricius)
Monoxia prob. angularis (LeConte)
Monoxia puncticollis (Say)
Pachybrachis sp.
Phyllotreta albionica LeConte
Phyllotreta cruciferae (Goeze)
Phyllotreta striolata (Fabricius)
Psylloides convexior LeConte
Psylloides punctulata Melsheimer
Trirhabda attenuata (Say)
Trirhabda nr borealis Blake
Trirhabda virgata LeConte

Bruchidae (=Mylabridae)

Acanthoscelides perforatus (Horn)
Bruchus fraterculus Horn
Bruchus seminulum Horn

Curculionidae

Amalus haemorrhous (Hbst.)
Anthonomus sp.
Apion sp.
Ceutorhynchus americanus Buch.
Ceutorhynchus punctiger Gyllenhal
Ceutorhynchus sp.
Euhrychiopsis albertana (Brown)
Grypus equiseti (Fabricius)
Hypera postica (Gyllenhal)
Hypera punctata (Fabricius)
Lepesoma alternata (Horn)
Listronotus sp.
Nanodes canadensis (Brown)
Notaris bimaculata (Fabricius)
Otiorhynchus ovatus (Linnaeus)
Panscopus aequalis (Horn)
Pseudothonomus sp.
Sitona cylindricollis Fahraeus
Sitona hispidulus (Fabricius)
Sitona lepidus Gyllenhal
Sitona scissifrons Say
Tychius picirostris (Fabricius)

Many species of carabids are carnivorous, nocturnal, and typically hunters. They feed on almost any living animal that they can overcome. Some probably feed on aphids that fall off alfalfa plants. Some species of *Amara*, *Harpalus*, and *Pterostichus* are known to destroy seeds, berries, and plants. The ground beetles in alfalfa have not been well studied. Thirty-seven species have been found in alfalfa in Alberta and Vas'kin (1985) reported 53 species on alfalfa in Russia. He reported that the ratio of predatory ground beetles to those with mixed feeding habits was 100:1. The carabid complex appears to be one of the most promising groups of predators for integrated control of insect pests in alfalfa.

Some species of hydrophylids of the genus *Helophorus* feed on roots and leaves of young plants but others are scavengers or predaceous. The family is uncommon in alfalfa.

The staphylinids are mainly carnivorous or saprophagous and are often found around decaying organic matter and dung. Some are predatory on diptera and others are associated with ants. Staphylinids, especially some species of *Tachyporus*, may also feed on aphids that fall off alfalfa plants.

The silphid, *A. bituberosa*, although commonly found in alfalfa does not appear to cause any damage to the crop. It is mainly a pest of sugar beets.

The histerids are associated with carrion or dung but many are saprophagous or predaceous. Their significance in alfalfa is not known.

The scarabaeids are mainly leaf chafers, scavengers and dung feeders. There are over 100 species of dung-feeding *Aphodius* in the prairie and grassland areas of north America.

The elaterids or wireworms are mainly subterranean feeders on seeds and plants in the larval stage. They can cause significant damage in alfalfa that is seeded into newly broken sod.

The cantharids and lampyrids are mainly predaceous families of beetles. The cantharids feed mainly on aphids, meally bugs, and other small insects and are often found in flowers. The lampyrids are predaceous on caterpillars and other insect larvae.

The dermestids and the anobiids generally feed on dead animals and dried plant material.

The clerids and the melyrids are predatory families. *T. nutalli* catches insects such as bees at alfalfa flowers. *C. bipunctatus* and *C. vittatus* feed on aphids.

The meloids are plant feeders as adults but have not been of economic importance on alfalfa in Alberta. The larvae feed on eggs of grasshoppers or brood chambers of ground nesting bees. Adults yield cantharidin which is used medicinally as an aphrodisiac, a vesicator, and a diuretic, and is known as "Spanish Fly". Some species of *Epicauta* are known to cause death to horses when eaten with infested alfalfa hay.

The mordellid larvae live in decaying wood but some species are predatory.

The tenebrionids feed mainly on dead and decaying organic matter. The nitulids are mainly saprophagous in both the adult and larval stages. The cyrtophagids live on fungi and decaying organic matter.

The coccinellids feed mainly on soft-bodied insects such as aphids and coccids and are important predators in alfalfa. Five species important as predators of the pea aphid and readily found in alfalfa fields are *C. transversoguttata richardsoni*, *H. parenthesis*, *H. quinquesignata*, *H. sinuata disjuncta*, and *H. tredecimpunctata*. Two other pea aphid predators that can be found in most fields are *C. trifasciata perplexa* and *C. novemnottata*.

The phalacrids and the latridiids are predatory. *S. apicalis* is a pea aphid predator.

The cerambycid genera *Crossidius* and *Tetraopes* attack roots and stems of small plants.

The chrysomelids are all plant feeders and include: the red turnip beetle, *E. americana*; the Colorado potato beetle, *L. decemlineata*; the three spotted flea beetle, *D. triangularis*; the cabbage flea beetle, *P. albionica*; the crucifera flea beetle, *P. cruciferae*; the striped flea beetle, *P. striolata*, and the hop flea beetle, *P. punctula*. None of these chrysomelids is causing damage to alfalfa in Alberta.

The bruchids are the seed weevils.

The curculonids are the weevils which include: the blue turnip weevil, *C. americanus*; the alfalfa weevil, *H. postica*; the clover weevil, *H. punctata*; the strawberry root weevil, *O. ovatus*; the sweetclover weevil, *S. cylindricollis*; the clover root weevil, *S. hispidulus*; the alfalfa curculio, *S. scissifrons*, and the clover seed weevil. The alfalfa weevil has caused damage to alfalfa on numerous occasions in Alberta. Although the alfalfa curculio is very common in alfalfa fields and can cause seedling damage it does not appear to be of economic importance. The insect has caused damage to sainfoin in Montana.

Diptera

Bibionidae

Bibio sp.

Tabanidae

Chrysops mitis Osten Sacken

Stratiomyidae

Sargus coprarius (Linnaeus)

Sargus viridis Say

Stratiomys normula Loew

Therevidae

Psilocephala aldrichi Coquillett

Thereva duplicitis Coquillett

Asilidae

Asilus sp.

Stenopogon inquinatus Loew

Bombyliidae

Systoechus vulgaris Loew

Dolichopodidae

Dolichopus bifractus Loew

Dolichopus brevipennis Loew

Dolichopus conspectus Van Duzee

Dolichopus jugalis Tucker

Dolichopus plumipes (Scopoli)

Dolichopus ramifer Loew

Dolichopus renidescens M. and B.

Dolichopus sp.

Raphium campestre Cn.

Scellus monstrosus Osten. Sacken

Lonchopteridae

Lonchoptera furcata Fallen

Phoridae

Megaselia sp.

Syrphidae

Eupoedes volucris Osten Sacken
Helophilus latifrons Loew
Metasyrphus lapponicus (Zetterstedt)
Metasyrphus sp.
Scaeva pyrastri (Linnaeus)
Sphaerophoria philanthus (Meigen) (=robusta Cn.)
Sphaerophoria sp.
Syritta pipiens (Linnaeus)
Syrphus torvus Osten Sacken
Syrphus vitripennis Meigen

Otitidae

Ceroxys latiusculus (Loew)
Tetanops myopaeformis (Roder)

Tephrididae

Paroxypha pygmaea Novak
Tephritis sp.

Agromyzidae

Liriomyza sp.

Lauxanidae

Camptoprosopella borealis Shewell

Heleomyzidae

Pseudoleria sp.

Chloropidae

Thaumatomyia bistriata (Walker)
Thaumatomyia glabra Meigen

Scathophagidae

Scathophaga stercoraria Linnaeus

Anthomyiidae

Hylemya (*Delia*) *extremitata* Malloch
Hylemya (*Delia*) *platura* (Meigen)
Hylemya (*Pegohylemya*) *fugax* (Meigen)
Pegomyia sp.

Muscidae

Helina duplicata (Meigen)
Limosia cilicauda (Malloch)

Musca domestica Linnaeus
Myospila meditabunda (Fabricius)
Ophyra leucostoma (Wiedemann)
Quadrularia laetifica (Rob.-Des.)

Calliphoridae

Bufolucilia silvarum (Meigen)
Pollenia rudis (Fabricius)

Sarcophagidae

Blaesoxipha atlantis (Aldrich)
Blaesoxipha kellyi (Aldrich)
Blaesoxipha sp.
Ravinia querula (Walker)
Sarcophaga harpax (Pandelle)
Sarcophaga sinuata Meigen

Tachinidae

Dinera grisescens (Fallen)
Leucostoma simplex (Fallen)
Peleteria iterans (Walker)

The asilid *S. inquinatus* was reported by Hobbs (1956) to kill honey bees.

The bombyliids of the genus *Systoechus* are reported to be ecto-parasites on beetle larvae living in the soil, especially scarabaeids (Askew 1971).

The dolichopodid are all predatory and the phorid genus *Megaselia* is parasitic, probably on millipedes.

The syrphids are generally predators of aphids. *E. volucris*, *S. pyrastri*, *S. philanthus* and *S. torvus* are all important predators of the pea aphid.

The otitid, *T. mypaeformis*, the sugarbeet root maggot, is frequently found in alfalfa fields in the irrigated areas where sugarbeets are grown.

The chloropid genus *Thaumatomyia* is known to be predatory on aphids. *T. glabra* is the most important predator of the sugarbeet root aphid in Alberta and Montana.

M. domestica is the common house fly. Some of the flies in the genus *Ophyra* cause myasis (Askew 1971).

The calliphorid fly *P. rudis* is a parasite of earthworms.

Some sarcophagids in the genus *Blaesoxipha* are parasites of grasshoppers (Askew 1971).

Some species in the genus *Sarcophaga* are parasites of grasshoppers (Askew 1971).

Many of the tachinids parasitize hymenoptera, coleoptera, diptera, lepidoptera and orthoptera (Askew 1971). *L. simplex* is a parasite of the predator *N. alternatus*.

Hymenoptera

Ichneumonidae

Bathyplectes curculionis (Thomson)
Hyposoter sp.

Braconidae

Meteorus proximus Cress.
Dinocampus (=*Perlitus*) *coccinellae* Schrank
Wesmalia pendula Foester

Aphidiidae

Aphidius ervi Haliday
Aphidius pulcher Baker
Aphidius smithi Sharma and Subbo Roa
Praon (prob.) *exoletum palitans* Muesbeck
Praon pequodorum Vierck

Pteromalidae

Asaphes suspensus (Nees)
Asaphes vulgaris (Walker)
Pachyneuron sp.

Megachilidae

Megachile brevis Say
Megachile dentitarsus Sladen
Megachile frigida Sm.
Megachile melanophae Sm.
Megachile perhirta Ckll.
Megachile rotundata Fabricius

Apidae

Apis mellifera Linnaeus
Bombus borealis Kirby
Bombus fervidus Fabricius
Bombus huntii Greene
Bombus nevadensis Cress.
Bombus occidentalis Greene
Bombus rufocinctus Cress.
Bombus ternarius Say
Bombus terricola Kirby

Alloxystidae

Alloxysta sp.

Ceraphronidae

Attritomellus (=Dendrocerus) niger (Howard)

Many hymenoptera are parasites, hyperparasites, or pollinators.

The ichneumonid *B. curculionis* is an important parasite of the alfalfa weevil, *H. postica*.

The braconid *M. proximus* is a parasite of the alfalfa caterpillar, *C. eurytheme*. *D. coccinellae* is a parasite of coccinellids which are predators of the pea aphid. *W. pendula* is a parasite of the western damsel bug, *N. alternatus*, which is a predator of the pea aphid and other small insects in alfalfa. Neither *D. coccinellae* nor *W. pendula* appear to severely limit predator populations at present as coccinellids and *N. alternatus* are present in all alfalfa fields in Alberta.

The aphidiid parasites in the genera *Aphidius* and *Praon* are parasites of aphids. They are important in the control of the pea aphid, *A. pisum*. A few specimens of *A. smithi* were found in southern Alberta in 1970. These were augmented by rearing large numbers in the laboratory and in field cages and releasing them throughout the irrigated areas. The parasite is now well established and has become one of the most important control agents for the pea aphid in the province.

A. suspensus is a hyperparasite of *D. coccinellae* and may be one of the reasons that the parasite of coccinellids is not more important. *A. vulgaris* is a hyperparasite of *Aphidius* spp. and *Charips* spp. It does not appear to seriously reduce populations of *A. smithi*, the most important parasite of *A. pisum* in Alberta.

The megachilids are pollinators of alfalfa. The first five species are native pollinators that nest in sod, while *M. rotundata* is the alfalfa leafcutter bee that has been domesticated for pollination of alfalfa.

A. mellifera, the honey bee, is found in all alfalfa fields but is not an important pollinator of alfalfa.

Bombus species are pollinators but many of them prefer red or sweet clover rather than alfalfa.

Charips spp. are hyperparasites of hymenopterous parasites.

A. niger is a hyperparasite of *D. coccinellidae* and may be quite important in keeping this parasite of coccinellids under control.

Acari

Ameroseiidae

Ameroseius corbicula (Sowerby)

Bdellidae

Biscirus silvaticus (Kramer)

Cunaxidae

Cunaxoides biscutum (Nesbitt)

Erythraeidae

Abrolaphus sp.

Oributulidae

Oribatula tibialis (Nicolet)

Phytoseiidae

Amblyseius iroquois Chant and Hansell

Tetranychidae

Petrobia latens (Muller)

Tetranychus urticae (Koch)

Trombiidae

Trombidium sp.

Mites generally are not serious problems in alfalfa in the field. In greenhouses, however, where there are no predators, mites must be frequently controlled by miticides. The tetranychid mites found in alfalfa are of considerable importance; *T. urticae*, the two spotted mite, is often a problem in greenhouses, and *P. latens*, the brown wheat mite, has been a problem on wheat and barley in southern Alberta. Mites in the genus *Amblyseius* are predators on other mites.

INSECT PESTS AND PREDATORS

In alfalfa in Alberta there are a number of insects that are pests or potential pests. These include: the pea aphid, *A. pisum*; the spotted alfalfa aphid, *T. maculata*; the alfalfa weevil, *H. postica*; the alfalfa curculio, *S. scissifrons*; the adelphocorids *A. lineolatus*, *A. superbus* and *A. rapidus*; several *Lygus* spp.; several grasshoppers, *Melanoplus* spp.; the alfalfa caterpillar, *C. eurytheme*; the alfalfa looper, *A. californica*; cutworms, *Euoxa* spp.; the alfalfa webworm, *L. cerealis*; wireworms; the thrips *O. loti*, *F. occidentalis* and *F. tritici*; the lygaeid *P. saskatchewanensis*, and the blister beetles *Epicauta* spp. and *L. nuttali*. The mite genus *Amblysius* is also predatory.

There are also a number of predators and parasites in alfalfa. Predators include: the thrip *A. fasciatus*; anthocorids *A. antevolens*, and *O. tristicolor*; mirids *D. histro*, *D. brevis*, *P. pallidicornis* and *O. obliquus*; the phymatid *P. pennsylvanica*; the reduviid *S. diadema*; several nabid species; several geocorids; many carabids; many staphalinids; the cantharid *C. oregonus*; the lampyrids *E. corrusca* and *L. lacustris*; the clerid *T. nutalli*; melyrids *Collops* spp.; several meloids; many coccinellids in the genera *Adalia*, *Brumus*, *Coccinella*, *Hippodamia*, *Hyperaspidius*, *Hyperaspis* and *Scymnus*; the phalacrid *S. apicalis*; several lathridiids; the bombyliid *S. vulgaris*; several dolichopodids, and the chloropids *Thaumatomyia* spp. The parasites include: the sarcophagids *Blaesoxipha* spp.; several tachnids; the ichneumonds *B. curculionis* and *Hyposoter* sp.; the braconids *M. proximus*, *D. coccinellae* and *W. pendula*; the aphidiids *Aphidius* spp. and *Praon* spp.; and the Pteromalids *A. suspensus*, *A. vulgaris* and *Pachyneuron*.

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Appendix I. List of Species of Insects in Alfalfa in Alberta

<i>Acalypta nyctalis</i> Drake	Hemiptera	Tingidae
<i>Acanthoscelides perforatus</i> (Horn)	Coleoptera	Bruchidae
<i>Aceratagallia arida</i> Oman	Homoptera	Cicadellidae
<i>Aceratagallia sanguinolenta</i> (Provancher)	Homoptera	Cicadellidae
<i>Acinopterus viridis</i> Ball	Homoptera	Cicadellidae
<i>Aclypea bituberosa</i> (LeConte)	Coleoptera	Silphidae
<i>Acyrthosiphon pisum</i> (Harris)	Homoptera	Aphididae
<i>Adalia bipunctata</i> (Linnaeus)	Coleoptera	Coccinellidae
<i>Adalia frigida</i> (Schneider)	Coleoptera	Coccinellidae
<i>Adelphocoris lineolatus</i> (Goeze)	Hemiptera	Miridae
<i>Adelphocoris rapidus</i> (Say)	Hemiptera	Miridae
<i>Adelphocoris superbus</i> (Uhler)	Hemiptera	Miridae
<i>Aeolothrips fasciatus</i> (Linnaeus)	Thysanoptera	Aeolothripidae
<i>Aeolus mellillus</i> (Say)	Coleoptera	Elateridae
<i>Agallia quadripunctata</i> (Provancher)	Homoptera	Cicadellidae
<i>Agalliopsis ancistra</i> Oman	Homoptera	Cicadellidae
<i>Agonum corvus</i> (LeConte)	Coleoptera	Carabidae
<i>Agonum placidum</i> (Say)	Coleoptera	Carabidae
<i>Agriotes criddlei</i> Van Dyke	Coleoptera	Elateridae
<i>Agrotis orthogonia</i> Morrison	Lepidoptera	Noctuidae
<i>Aleochara</i> nr <i>bimaculata</i> (Grav.)	Coleoptera	Staphylinidae
<i>Alloxysta</i> sp.	Hymenoptera	Alloxystidae
<i>Altica</i> sp.	Coleoptera	Chrysomelidae
<i>Alydus conspersus</i> (Montandon)	Hemiptera	Coreidae
<i>Alydus eurinus</i> Say	Hemiptera	Coreidae
<i>Amalus haemorrhous</i> (Hbst.)	Coleoptera	Curculionidae
<i>Amara apricara</i> (Paykull)	Coleoptera	Carabidae
<i>Amara carinata</i> (LeConte)	Coleoptera	Carabidae
<i>Amara farcta</i> LeConte	Coleoptera	Carabidae
<i>Amara lacustris</i> LeConte	Coleoptera	Carabidae
<i>Amara littoralis</i> Mannerheim	Coleoptera	Carabidae
<i>Amara obesa</i> (Say)	Coleoptera	Carabidae
<i>Amara quenseli</i> (Schonherr)	Coleoptera	Carabidae
<i>Amara torrida</i> (Panzer)	Coleoptera	Carabidae

<i>Ambysellus grex</i> (Oman)	Homoptera	Cicadellidae
<i>Amplicecephalus</i> (Endria) <i>inimica</i> (Say)	Homoptera	Cicadellidae
<i>Anabrus simplex</i> Haldeman	Orthoptera	Tettigoniidae
<i>Anagrapha falcifera</i> (Kirby)	Lepidoptera	Noctuidae
<i>Anchicera</i> sp.	Coleoptera	Cryptophagidae
<i>Anotylus sobrinus</i> (LeConte)	Coleoptera	Staphylinidae
<i>Anthicus flavicans</i> LeConte	Coleoptera	Anthicidae
<i>Anthicus hastatus</i> Casey	Coleoptera	Anthicidae
<i>Anthicus lutulentus</i> Casey	Coleoptera	Anthicidae
<i>Anthicus punctulatus</i> LeConte	Coleoptera	Anthicidae
<i>Anthocoris antevolens</i> White	Hemiptera	Anthocoridae
<i>Anthonomus</i> sp.	Coleoptera	Curculionidae
<i>Aphalara</i> sp.	Homoptera	Psyllidae
<i>Aphidius ervi</i> Haliday	Hymenoptera	Aphidiidae
<i>Aphidius pulcher</i> Baker	Hymenoptera	Aphidiidae
<i>Aphidius smithi</i> Sharma and Subbo Roa	Hymenoptera	Aphidiidae
<i>Aphodius</i> (?) <i>albertanus</i> Brown	Coleoptera	Scarabaeidae
<i>Aphodius alternatus</i> Horn	Coleoptera	Scarabaeidae
<i>Aphodius granarius</i> (Linneaus)	Coleoptera	Scarabaeidae
<i>Aphodius pinguis</i> Hald.	Coleoptera	Scarabaeidae
<i>Aphrodes bicinctus</i> (Schrink)	Homoptera	Cicadellidae
<i>Apion</i> sp.	Coleoptera	Cnidae
<i>Apis mellifera</i> Linnaeus	Hymenoptera	Apidae
<i>Asaphes suspensus</i> (Nees)	Hymenoptera	Pteromalidae
<i>Asaphes vulgaris</i> (Walker)	Hymenoptera	Pteromalidae
<i>Asilus</i> sp.	Diptera	Asilidae
<i>Athysanella</i> sp.	Homoptera	Cicadellidae
<i>Atomoscelis modestus</i> (Van Duzee)	Hemiptera	Miridae
<i>Attritomellus niger</i> (Howard)	Hymenoptera	Ceraphonidae
<i>Auridius auratus</i> (Gillette and Baker)	Homoptera	Cicadellidae
<i>Autographa californica</i> (Speyer)	Lepidoptera	Noctuidae
<i>Axinopalpus biplagiatus</i> Dejean	Coleoptera	Carabidae
<i>Bathyplectes curculionis</i> (Thomson)	Hymenoptera	Ichneumonidae
<i>Bembidion bimaculatum</i> (Kirby)	Coleoptera	Carabidae
<i>Bembidion coloradense</i> Hayward	Coleoptera	Carabidae

<i>Bembidion mutatum</i> Gemminger and Harold	Coleoptera	Carabidae
<i>Bembidion nitidum</i> (Kirby)	Coleoptera	Carabidae
<i>Bembidion obscurellum</i> (Motschulsky)	Coleoptera	Carabidae
<i>Bembidion praecinctum</i> LeConte	Coleoptera	Carabidae
<i>Bembidion quadrimaculatum</i> (Linnaeus)	Coleoptera	Carabidae
<i>Bembidion rupicola</i> (Kirby)	Coleoptera	Carabidae
<i>Bembidion nr versicolor</i> (LeConte)	Coleoptera	Carabidae
<i>Bibio</i> sp.	Diptera	Bibionidae
<i>Blaesoxipha atlanis</i> (Aldrich)	Diptera	Sarcophagidae
<i>Blaesoxipha kellyi</i> (Aldrich)	Diptera	Sarcophagidae
<i>Blaesoxipha</i> sp.	Diptera	Sarcophagidae
<i>Blastinus</i> sp.	Coleoptera	Tenebrionidae
<i>Bombus borealis</i> Kirby	Hymenoptera	Apidae
<i>Bombus fervidus</i> Fabricius	Hymenoptera	Apidae
<i>Bombus huntii</i> Greene	Hymenoptera	Apidae
<i>Bombus nevadensis</i> Cress.	Hymenoptera	Apidae
<i>Bombus occidentalis</i> Greene	Hymenoptera	Apidae
<i>Bombus rufocinctus</i> Cress.	Hymenoptera	Apidae
<i>Bombus ternarius</i> Say	Hymenoptera	Apidae
<i>Bombus terricola</i> Kirby	Hymenoptera	Apidae
<i>Bourletiella hortensis</i> (Fitch)	Collembola	Sminthuridae
<i>Bradycellus congener</i> (LeConte)	Coleoptera	Carabidae
<i>Bradycellus nigerrimus</i> Lindroth	Coleoptera	Carabidae
<i>Bruchus fraterculus</i> Horn	Coleoptera	Bruchidae
<i>Bruchus seminulum</i> Horn	Coleoptera	Bruchidae
<i>Brumoides septentrionis</i> Weise	Coleoptera	Coccinellidae
<i>Bufolucilia silvarum</i> (Meigen)	Diptera	Calliphoridae
<i>Caenocara scymnoides</i> LeConte	Coleoptera	Anobiidae
<i>Calligrapha californica</i>		
<i>coreopsivora</i> Brown	Coleoptera	Chrysomelidae
<i>Calosoma osoletum</i> Say	Coleoptera	Carabidae
<i>Camnula pellucida</i> (Scudder)	Orthoptera	Acrididae
<i>Camptoprosopella borealis</i> Shewell	Diptera	Lauxanidae
<i>Campylenchia latipes</i> Say	Homoptera	Membracidae
<i>Cantharis oregonus</i> LeConte	Coleoptera	Cantharidae

<i>Cantharis</i> sp.	Coleoptera	Cantharidae
<i>Capsus simulans</i> (Stal)	Hemiptera	Miridae
<i>Carpocoris remotus</i> Horvath	Hemiptera	Pentatomidae
<i>Ceroxys latiusculus</i> (Loew)	Diptera	Otitidae
<i>Ceutorhynchus americanus</i> Buch.	Coleoptera	Curculionidae
<i>Ceutorhynchus punctiger</i> Gyllenhal	Coleoptera	Curculionidae
<i>Ceutorhynchus</i> sp.	Coleoptera	Curculionidae
<i>Chaetocnema protensa</i> LeConte	Coleoptera	Chrysomelidae
<i>Chaetocnema</i> sp.	Coleoptera	Chrysomelidae
<i>Chirothrips manicatus</i> Haliday	Thysanoptera	Chirothripidae
<i>Chirothrips</i> nr <i>productus</i>	Thysanoptera	Chirothripidae
<i>Chlamydatus pulicarius</i> (Fallen)	Hemiptera	Miridae
<i>Chlamydatus pullus</i> (Reuter)	Hemiptera	Miridae
<i>Chlorotettix unicolor</i> (Fitch)	Homoptera	Cicadellidae
<i>Chryptophagus acutangulus</i> Gyllenhal	Coleoptera	Cryptophagidae
<i>Chrysolina</i> sp.	Coleoptera	Chrysomelidae
<i>Chrysopa carnea</i> Stephens	Neuroptera	Chrysopidae
<i>Chrysopa oculata</i> Say	Neuroptera	Chrysopidae
<i>Chrysopa plorobunda</i> see <i>C. Carnea</i>	Neuroptera	Chrysopidae
<i>Chrysops mitis</i> Osten Sacken	Diptera	Tabinida
<i>Coccinella novemnottata</i> Herbst	Coleoptera	Coccinellidae
<i>Coccinella transversoguttata richardsoni</i> Brown	Coleoptera	Coccinellidae
<i>Coccinella trifasciata</i> <i>perplexa</i> Mulsant	Coleoptera	Coccinellidae
<i>Codophila remotus</i> (How.)	Hemiptera	Pentatomidae
<i>Coenus delius</i> (Say)	Hemiptera	Pentatomidae
<i>Colias eurytheme</i> Boisduval	Lepidoptera	Pieridae
<i>Colladonus geminatus</i> (Van Duzee)	Homoptera	Cicadellidae
<i>Colladonus montanus</i> (Van Duzee)	Homoptera	Cicadellidae
<i>Collops bipunctatus</i> Say	Coleoptera	Melyridae
<i>Collops hirtellus</i> LeConte	Coleoptera	Melyridae
<i>Collops vittatus</i> Say	Coleoptera	Melyridae
<i>Corimelaena pulicaria</i> (Germ)	Hemiptera	Cydnidae
<i>Coriomerus humulidis</i> Uhler	Hemiptera	Coreidae
<i>Coriza</i> sp.	Hemiptera	Corizidae

<i>Corizus</i> sp.	Hemiptera	Miridae
<i>Corticarina</i> sp.	Coleoptera	Lathridiidae
<i>Corythucha coryli</i> O. and D.	Hemiptera	Tingidae
<i>Cosmopepla bimaculata</i> Thomas	Hemiptera	Pentatomidae
<i>Crepidodera nana</i> (Say)	Coleoptera	Chrysomelidae
<i>Crossidius pullchelus</i> LeConte	Coleoptera	Cerambycidae
<i>Cryptophagus acutangulus</i> Gyllenhal	Coleoptera	Cryptophagidae
<i>Ctenicera pudica</i> (Brown)	Coleoptera	Elateridae
<i>Cymus luridus</i> Stal	Hemiptera	Lygaeidae
<i>Cyphon variabilis</i> Thunb.	Coleoptera	Helodidae
<i>Dalopius pallidus</i> Brown	Coleoptera	Elateridae
<i>Deltocephalus lineatifrons</i> Oman	Homoptera	Cicadellidae
<i>Dendrocerus</i> see <i>Attritomellus</i>	Hymenoptera	Ceraphonidae
<i>Deraeocoris brevis</i> (Uhler)	Hemiptera	Miridae
<i>Deraeocoris histrio</i> (Reuter)	Hemiptera	Miridae
<i>Dermestes</i> sp.	Coleoptera	Dermestidae
<i>Deuterosminthurus repandus</i> (Agren.)	Collembola	Sminthuridae
<i>Dinera grisescens</i> (Fallen)	Diptera	Tachinidae
<i>Dinocampus coccinellae</i> Schrank	Hymenoptera	Braconidae
<i>Diplocelesus</i> (Verdanus) <i>evansi</i> (Ashmead)	Homoptera	Cicadellidae
<i>Discestra trifolii</i> (Hufnagel)	Lepidoptera	Noctuidae
<i>Disonycha latifrons</i> Schaeffer	Coleoptera	Chrysomelidae
<i>Disonycha triangularis</i> (Say)	Coleoptera	Chrysomelidae
<i>Dolichonabis propinguus</i> (Reuter)	Hemiptera	Nabidae
<i>Dolichopus bifractus</i> Loew	Diptera	Dolichopodidae
<i>Dolichopus brevipennis</i> Loew	Diptera	Dolichopodidae
<i>Dolichopus conspectus</i> Van Duzee	Diptera	Dolichopodidae
<i>Dolichopus jugalis</i> Tucker	Diptera	Dolichopodidae
<i>Dolichopus plumipes</i> (Scopoli)	Diptera	Dolichopodidae
<i>Dolichopus ramifer</i> Loew	Diptera	Dolichopodidae
<i>Dolichopus renidescens</i> M. and B.	Diptera	Dolichopodidae
<i>Dolichopus</i> sp.	Diptera	Dolichopodidae
<i>Dorycephalus platyrhynchus</i> Osb.	Homoptera	Cicadellidae
<i>Draeculacephala novaeboracensis</i> (Fitch)	Homoptera	Cicadellidae
<i>Ellychnia corrusca</i> (Linnaeus)	Coleoptera	Lampyridae

<i>Ellychnia lacustris</i> LeConte	Coleoptera	Lampyridae
<i>Emblethis vicarius</i> Horvath	Hemiptera	Lygaeidae
<i>Empoasca (Kyboasca) bipunctata</i> (Osb.)	Homoptera	Cicadellidae
<i>Enicmus mimus</i> Fall.	Coleoptera	Lathridiidae
<i>Entomoscelis americana</i> Brown	Coleoptera	Chrysomelidae
<i>Epicauta ferruginea</i> (Say)	Coleoptera	Meloidae
<i>Epicauta maculata</i> (Say)	Coleoptera	Meloidae
<i>Epicauta normalis</i> Werner	Coleoptera	Meloidae
<i>Epicauta oregonia</i> Horn	Coleoptera	Meloidae
<i>Epicauta pensylvanica</i> (DeGeer)	Coleoptera	Meloidae
<i>Epicauta puncticollis</i> Mann	Coleoptera	Meloidae
<i>Epicauta subglabra</i> (Fall.)	Coleoptera	Meloidae
<i>Epuraea</i> sp.	Coleoptera	Nitulidae
<i>Eucinetus terminalis</i> LeConte	Coleoptera	Eucinetidae
<i>Euhrychiopsis albertana</i> (Brown)	Coleoptera	Curculionidae
<i>Eupoedes volucris</i> Osten Sacken	Diptera	Syrphidae
<i>Euscelidius maculipennis</i> (DeL. and Dav.)	Homoptera	Cicadellidae
<i>Euspilotus insertus</i> (LeConte)	Coleoptera	Histeridae
<i>Euxoa auxiliaris</i> (Grote)	Lepidoptera	Noctuidae
<i>Euxoa ochrogaster</i> (Guenee)	Lepidoptera	Noctuidae
<i>Extrusanus extrusus</i> (Van Duzee)	Homoptera	Cicadellidae
<i>Frankliniella occidentalis</i> (Pergande)	Thysanoptera	Thripidae
<i>Frankliniella tritici</i> (Fitch)	Thysanoptera	Thripidae
<i>Gabrius picipennis</i> (Mannh.)	Coleoptera	Staphylinidae
<i>Galeruca browni</i> Blake ?	Coleoptera	Chrysomelidae
<i>Gastrophysa cyanea</i> Melsheimer	Coleoptera	Chrysomelidae
<i>Gastrophysa polygoni</i> (Linnaeus)	Coleoptera	Chrysomelidae
<i>Geocoris atricolor</i> Mont.	Hemiptera	Lygaeidae
<i>Geocoris bullatus</i> Say	Hemiptera	Lygaeidae
<i>Geocoris discopterus</i> (Stal)	Hemiptera	Lygaeidae
<i>Geocoris nr pallens</i>	Hemiptera	Lygaeidae
<i>Geocoris uliginosis</i> Say	Hemiptera	Lygaeidae
<i>Gnypeta</i> sp.	Coleoptera	Staphylinidae
<i>Grypus equiseti</i> (Fabricius)	Coleoptera	Curculionidae
<i>Gyponana quebecensis</i> (Provancher)	Homoptera	Cicadallidae
<i>Hadronema militaris</i> Uhler	Hemiptera	Miridae

<i>Halothrips malifloris</i> complex	Thysanoptera	Phleothripidae
<i>Harpalellus basilaris</i> (Kirby)	Coleoptera	Carabidae
<i>Harpalus amputatus</i> Say	Coleoptera	Carabidae
<i>Harpalus fumerarius</i> Csiki	Coleoptera	Carabidae
<i>Harpalus nr uteanus</i> Casey	Coleoptera	Carabidae
<i>Harpalus</i> sp.	Coleoptera	Carabidae
<i>Hecalus major</i> (Osb.)	Homoptera	Cicadellidae
<i>Helina duplicata</i> (Meigen)	Diptera	Muscidae
<i>Helocharis communis</i> Fitch	Homoptera	Cicadellidae
<i>Helophilus latrifrons</i> Loew	Diptera	Syrphidae
<i>Helophorus orientalis</i> Motsch.	Coleoptera	Hydrophilidae
<i>Hemicrepidius memnonius</i> (Hbst.)	Coleoptera	Elateridae
<i>Hippodamia caseyi</i> Johnson	Coleoptera	Coccinellidae
<i>Hippodamia convergens</i> Guerin	Coleoptera	Coccinellidae
<i>Hippodamia glacialis</i> (Fabricius)	Coleoptera	Coccinellidae
<i>Hippodamia parenthesis</i> (Say)	Coleoptera	Coccinellidae
<i>Hippodamia quinquesignata</i> (Kirby)	Coleoptera	Coccinellidae
<i>Hippodamia sinuata crotchi</i> Casey	Coleoptera	Coccinellidae
<i>Hippodamia tredecimpunctata</i>	Coleoptera	Coccinellidae
<i>tibialis</i> (Say)		
<i>Holcostethus limbolarius</i> Stal	Hemiptera	Scutelleridae
<i>Homaemus aeneifrons consors</i> Uhler	Hemiptera	Scutelleridae
<i>Hylemya</i> (<i>Delia</i>) <i>extremitata</i> Malloch	Diptera	Anthomyiidae
<i>Hylemya</i> (<i>Delia</i>) <i>platura</i> (Meigen)	Diptera	Anthomyiidae
<i>Hylemya</i> (<i>Pegohylemya</i>) <i>fugax</i> (Meigen)	Diptera	Anthomyiidae
<i>Hypera postica</i> (Gyllenhal)	Coleoptera	Curculionidae
<i>Hypera punctata</i> (Fabricius)	Coleoptera	Curculionidae
<i>Hyperaspidius vittigerus</i> (LeConte)	Coleoptera	Coccinellidae
<i>Hyperaspis inflexa</i> Casey	Coleoptera	Coccinellidae
<i>Hyperaspis lateralis</i> Mulsant	Coleoptera	Coccinellidae
<i>Hyperaspis quadrivittata</i> LeConte	Coleoptera	Coccinellidae
<i>Hyperaspis undulata</i> (Say)	Coleoptera	Coccinellidae
<i>Hypogastrura manubrialis</i> (Tullberg)	Collembola	Poduridae
<i>Hypolithus bicolor</i> Esch.	Coleoptera	Elateridae
<i>Hyposoter</i> sp.	Hymenoptera	Ichneumonidae
<i>Ilnacora nr albifrons</i> Knight	Hemiptera	Miridae

<i>Labops hesperus</i> Uhler	Hemiptera	Miridae
<i>Labops simulans</i> Stal	Hemiptera	Miridae
<i>Laccocera vittipennis</i> Van Duzee	Homoptera	Delphacidae
<i>Lepesoma alteranata</i> (Horn)	Coleoptera	Curculionidae
<i>Leptacinus intermedius</i> Don	Coleoptera	Staphylinidae
<i>Leptinotarsa decemlineata</i> (Say)	Coleoptera	Chrysomelidae
<i>Leucostoma simplex</i> (Fallen)	Diptera	Tachinidae
<i>Liburna ocellusa</i> Van Duzee	Homoptera	Delphacidae
<i>Liburna pellucida</i> (Fabricius)	Homoptera	Delphacidae
<i>Liburna</i> sp.	Homoptera	Delphacidae
<i>Ligyrocoris sylvestris</i> (Linnaeus)	Hemiptera	Lygaeidae
<i>Limosia cilicaua</i> (Malloch)	Diptera	Muscidae
<i>Limothrips denticornis</i> Haliday	Thysanoptera	Thripidae
<i>Liriomyza</i> sp.	Diptera	Agromyzidae
<i>Listronotus</i> sp.	Coleoptera	Curculionidae
<i>Litomeris debilis</i> (Uhler)	Hemiptera	Miridae
<i>Livia</i> sp.	Homoptera	Psyllidae
<i>Lonchoptera furcata</i> Fallen	Diptera	Lonchopteridae
<i>Longitarsus</i> sp.	Coleoptera	Chrysomelidae
<i>Lopidea dakota</i> Knight	Hemiptera	Miridae
<i>Lopus</i> sp.	Hemiptera	Miridae
<i>Loricera pilicornis</i> (Fabricius)	Coleoptera	Carabidae
<i>Loxostege cereralis</i> (Zeller)	Lepidoptera	Pyralidae
<i>Loxostege sticticalis</i> (Linnaeus)	Lepidoptera	Pyralidae
<i>Lygaeus kalmii</i> Stal	Hemiptera	Lygaeidae
<i>Lygidea</i> sp.	Hemiptera	Miridae
<i>Lygus borealis</i> (Kelton)	Hemiptera	Miridae
<i>Lygus desertinus</i> Knight	Hemiptera	Miridae
<i>Lygus elisus</i> Van Duzee	Hemiptera	Miridae
<i>Lygus lineolaris</i> (Palisot de Beauvois)	Hemiptera	Miridae
<i>Lygus rufidorsus</i> (Kelton)	Hemiptera	Miridae
<i>Lygus shulli</i> (Knight)	Hemiptera	Miridae
<i>Lygus unctuosus</i> Kelton	Hemiptera	Miridae
<i>Lytta nuttali</i> Say	Coleoptera	Meloidae
<i>Macrohaltica</i> sp.	Coleoptera	Chrysomelidae
<i>Macrosteles fascifrons</i> (Stal)	Homoptera	Cicadellidae

<i>Malachius aeneus</i> (Linnaeus)	Coleoptera	Melyridae
<i>Megachile brevis</i> Say	Hymenoptera	Megachilidae
<i>Megachile dentitarsus</i> Sladen	Hymenoptera	Megachilidae
<i>Megachile frigida</i> Sm.	Hymenoptera	Megachilidae
<i>Megachile melanophae</i> Sm.	Hymenoptera	Megachilidae
<i>Megachile perhirta</i> Ckll.	Hymenoptera	Megachilidae
<i>Megachile rotundata</i> Fabricius	Hymenoptera	Megachilidae
<i>Megalotamus quinquespinosus</i> Say	Hemiptera	Coreidae
<i>Megaselia</i> sp.	Diptera	Phoridae
<i>Melanophthalma</i> sp.	Coleoptera	Lathridiidae
<i>Melanoplus bivittatus</i> (Say)	Orthoptera	Acrididae
<i>Melanoplus femur-rubrum</i> (DeGeer)	Orthoptera	Acrididae
<i>Melanoplus packardii</i> Scudder	Orthoptera	Acrididae
<i>Melanoplus sanguinipes</i> (Fabricius)	Orthoptera	Acrididae
<i>Melanotrichus coagulatus</i> (Uhler)	Hemiptera	Miridae
<i>Melanotrichus flavosparsus</i> (Sahlberg)	Hemiptera	Miridae
<i>Metabletus americanus</i> (Dejean)	Coleoptera	Carabidae
<i>Metasyrphus lapponicus</i> (Zetterstedt)	Diptera	Syrphidae
<i>Metasyrphus</i> sp.	Diptera	Syrphidae
<i>Meteorus proximus</i> Cress.	Hymenoptera	Braconidae
<i>Microlestes linearis</i> (LeConte)	Coleoptera	Carabidae
<i>Microrhophala vittata</i> (Fabricius)	Coleoptera	Chrysomelidae
<i>Mimoceps insignis</i> Uhler	Hemiptera	Miridae
<i>Monoxia</i> prob. <i>angularis</i> (LeConte)	Coleoptera	Chrysomelidae
<i>Monoxia puncticollis</i> (Say)	Coleoptera	Chrysomelidae
<i>Mordellistena</i> sp.	Coleoptera	Mordellidae
<i>Musca domestica</i> Linnaeus	Diptera	Muscidae
<i>Myospila meditabunda</i> (Fabricius)	Diptera	Muscidae
<i>Nabis alternatus</i> Parshley	Hemiptera	Nabidae
<i>Nabis limbatus</i> Dahlbom	Hemiptera	Nabidae
<i>Nabis subcoleoptratus</i> (Kirby)	Hemiptera	Nabidae
<i>Nabis van duzee</i> Kirk	Hemiptera	Nabidae
<i>Nanodes canadensis</i> (Brown)	Coleoptera	Curculionidae
<i>Nearctaphis bakeri</i> (Cowen)	Homoptera	Aphididae
<i>Neohypnus hamatus</i> (Say)	Coleoptera	Staphylinidae
<i>Neohypnus obscurus</i> (Er.)	Coleoptera	Staphylinidae

<i>Neottiglossa undata</i> Say	Hemiptera	Pentatomidae
<i>Notaris bimaculata</i> (Fabricius)	Coleoptera	Curculionidae
<i>Notiophilus aquaticus</i> (Linneaus)	Coleoptera	Carabidae
<i>Notoxus anchora</i> Hentz	Coleoptera	Anthicidae
<i>Nysius ericae</i> Schilling	Hemiptera	Lygaeidae
<i>Nysius minutus</i> Uhler	Hemiptera	Lygaeidae
<i>Odontothrips loti</i> (Haliday)	Thysanoptera	Thripidae
<i>Oedostethus femoralis</i> LeConte	Coleoptera	Elateridae
<i>Onthophagus nuchicornis</i> Linnaeus	Coleoptera	Scarabaeidae
<i>Ophyra leucostoma</i> (Wiedemann)	Diptera	Muscidae
<i>Orectoderus obliquus</i> Uhler	Hemiptera	Miridae
<i>Orius tristis</i> (White)	Hemiptera	Anthocoridae
<i>Orthotylus fusicornis</i> Knight	Hemiptera	Miridae
<i>Otiorhynchus ovatus</i> (Linnaeus)	Coleoptera	Curculionidae
<i>Pachybrachis</i> sp.	Coleoptera	Chrysomelidae
<i>Pachyneuron</i> sp.	Hymenoptera	Pteromalidae
<i>Panscopus aequalis</i> (Horn)	Coleoptera	Curculionidae
<i>Paroxyna pygmaea</i> Novak	Diptera	Tephrididae
<i>Pegomyia</i> sp.	Diptera	Anthomyiidae
<i>Peleteria iterans</i> (Walker)	Diptera	Tachinidae
<i>Perilitus</i> see <i>Dinocampus</i>	Hymenoptera	Braconidae
<i>Peritrichus saskatchewanensis</i> Barb.	Hemiptera	Lygaeidae
<i>Phalacrus</i> sp.	Coleoptera	Phalacridae
<i>Philaenarcys bilineata</i> (Say)	Homoptera	Cercopidae
<i>Philaenus spumarius</i> (Linnaeus)	Homoptera	Cercopidae
<i>Philonthus concinnus</i> Grav.	Coleoptera	Staphylinidae
<i>Philonthus fuscipennis</i> Mannh.	Coleoptera	Staphylinidae
<i>Philonthus laetus</i> Cs.	Coleoptera	Staphylinidae
<i>Philonthus occidentalis</i> Horn	Coleoptera	Staphylinidae
<i>Philonthus sordidus</i> (Grav.)	Coleoptera	Staphylinidae
<i>Philonthus varius</i> (Gyllenhal)	Coleoptera	Staphylinidae
<i>Phyllobaenus</i> sp.	Coleoptera	Cleridae
<i>Phyllotreta albionica</i> LeConte	Coleoptera	Chrysomelidae
<i>Phyllotreta cruciferae</i> (Goeze)	Coleoptera	Chrysomelidae
<i>Phyllotreta striolata</i> (Fabricius)	Coleoptera	Chrysomelidae
<i>Phymata pennsylvanica</i> Handl.	Hemiptera	Phymatidae

<i>Phytocoris pallidicornis</i> Reuter	Hemiptera	Miridae
<i>Piesma cinerea</i> Say	Hemiptera	Piesmidae
<i>Plagiognathus obscurus</i> Uhler	Hemiptera	Miridae
<i>Plagniognathus</i> sp.	Hemiptera	Miridae
<i>Platystethus americanus</i> Er.	Coleoptera	Staphylinidae
<i>Podisus placidus</i> Uhler	Hemiptera	Pentatomidae
<i>Poecilus lucublandus</i> (Say)	Coleoptera	Carabidae
<i>Pollenia rufipes</i> (Fabricius)	Diptera	Calliphoridae
<i>Polymerus prob.</i> <i>rufipes</i> Knight	Hemiptera	Miridae
<i>Prairiana cinerea</i> (Uhler)	Homoptera	Cicadellidae
<i>Praon prob.</i> <i>exoletum</i> <i>palitans</i> Muesbeck	Hymenoptera	Aphidiidae
<i>Praon pequodorum</i> Vierck	Hymenoptera	Aphidiidae
<i>Psammotettix lividellus</i> (Zett.)	Homoptera	Cicidellidae
<i>Pseudoleria</i> sp.	Diptera	Heleomyzidae
<i>Pseudeothonomus</i> sp.	Coleoptera	Curculionidae
<i>Psilocephala aldrichi</i> Coquillett	Diptera	Therevidae
<i>Psylla</i> sp.	Homoptera	Psyllidae
<i>Psylloides convexior</i> LeConte	Coleoptera	Chrysomelidae
<i>Psylloides punctulata</i> Melsheimer	Coleoptera	Chrysomelidae
<i>Pterostichus melanarius</i> (Illiger)	Coleoptera	Carabidae
<i>Quadrularia laetifica</i> (Rob.-Des.)	Diptera	Muscidae
<i>Raphium campestre</i> Cn.	Diptera	Dolichopodidae
<i>Ravinia querula</i> (Walker)	Diptera	Sarcophagidae
<i>Rhopalus crassicornis</i> (Linnaeus)	Hemiptera	Coreidae
<i>Saldula palustris</i> (Douglas)	Hemiptera	Saldidae
<i>Sarcophaga harpax</i> (Pandelle)	Diptera	Sarcophagidae
<i>Sarcophaga sinuata</i> Meigen	Diptera	Sarcophagidae
<i>Sargus coprarius</i> (Linnaeus)	Diptera	Stratiomyiidae
<i>Sargus viridis</i> Say	Diptera	Stratiomyiidae
<i>Scaeva pyrastri</i> (Linnaeus)	Diptera	Syrphidae
<i>Scathophaga stercoraria</i> Linnaeus	Diptera	Scathophagidae
<i>Scellus monstrosus</i> Osten. Sacken	Diptera	Dolichopodidae
<i>Sciocoris microphthalmus</i> Flor.	Hemiptera	Pentatomidae
<i>Scotogramma</i> see <i>Discestra</i>	Lepidoptera	Noctuidae
<i>Scymnus (Pullus) caudalis</i> LeConte	Coleoptera	Coccinellidae
<i>Scymnus (Pullus) postpictus</i> Casey	Coleoptera	Coccinellidae

<i>Scymnus (Pullus) puncticollis</i> LeConte	Coleoptera	Coccinellidae
<i>Scymnus</i> sp.	Coleoptera	Coccinellidae
<i>Sehirus cinctus</i> (Palisot de Beauvois)	Hemiptera	Cydnidae
<i>Sinea diadema</i> Fabricius	Hemiptera	Reduviidae
<i>Sitona cylindricollis</i> Fahraeus	Coleoptera	Curculionidae
<i>Sitona hispidulus</i> (Fabricius)	Coleoptera	Curculionidae
<i>Sitona lepidus</i> Gyllenhal	Coleoptera	Curculionidae
<i>Sitona scissifrons</i> Say	Coleoptera	Curculionidae
<i>Slaterobius insignis</i> (Uhler)	Hemiptera	Lygaeidae
<i>Slaterocoris prob. stygicus</i> Say	Hemiptera	Miridae
<i>Sminthurinus elegans</i> (Fitch)	Collembola	Sminthuridae
<i>Sminthurinus medialis</i> (Mills)	Collembola	Sminthuridae
<i>Sorhoanus uhleri</i> (Oman)	Homoptera	Cicidellidae
<i>Sphaerophoria philanthus</i> (Meigen)	Diptera	Syrphidae
<i>Sphaerophoria robusta</i> see <i>S. philanthus</i>	Diptera	Syrphidae
<i>Sphaerophoria</i> sp.	Diptera	Syrphidae
<i>Sphragisticus nebulosus</i> (Fall.)	Hemiptera	Lygaeidae
<i>Stenodema trispinosum</i> (Reuter)	Hemiptera	Miridae
<i>Stenodema vicinum</i> (Provancher)	Hemiptera	Miridae
<i>Stenodema virens</i> Linnaeus	Hemiptera	Miridae
<i>Stenolophus comma</i> (Fabricius)	Coleoptera	Carabidae
<i>Stenolophus conjunctus</i> (Say)	Coleoptera	Carabidae
<i>Stenopogon inquinatus</i> Loew	Diptera	Asilidae
<i>Stenus (Hypostenus) reconditus</i>		
<i>breviusculus</i> Puthz	Coleoptera	Staphylinidae
<i>Stenus (s.st.) morio</i> Grav.	Coleoptera	Staphylinidae
<i>Stenus (s.st.) occidentalis</i> Csy ?	Coleoptera	Staphylinidae
<i>Stenus vicinoides</i> Puthz	Coleoptera	Staphylinidae
<i>Stictocephala basalis</i> (Walker)	Homoptera	Membracidae
<i>Stictocephala bisonia</i> (Kopp and Yke)	Homoptera	Membracidae
<i>Stictopleuris punctiventris</i> (Dallas)	Hemiptera	Coreidae
<i>Stictopleuris viridicatus</i> (Uhler)	Hemiptera	Coreidae
<i>Stillbus apicalis</i> Melsheimer	Coleoptera	Phalacridae
<i>Stillbus</i> sp.	Coleoptera	Phalacridae
<i>Stratiomys normula</i> Loew	Diptera	Stratiomyiidae
<i>Streptanus deceptus</i> (Sd. and DeLong)	Homoptera	Cicidellidae

<i>Syritta pipiens</i> (Linnaeus)	Diptera	Syrphidae
<i>Syrphus torvus</i> Osten Sacken	Diptera	Syrphidae
<i>Syrphus vitripennis</i> Meigen	Diptera	Syrphidae
<i>Systoechus vulgaris</i> Loew	Diptera	Bombyliidae
<i>Tachyporus inornatus</i> Campbell	Coleoptera	Staphylinidae
<i>Tachyporus mexicanus</i> Sharp	Coleoptera	Staphylinidae
<i>Tachyporus nitidulus</i> (Fabricius)	Coleoptera	Staphylinidae
<i>Tephritis</i> sp.	Diptera	Tephrididae
<i>Tetanops myopaeformis</i> (Roder)	Diptera	Otitidae
<i>Tetraopes femoratus</i> LeConte	Coleoptera	Cerambydidae
<i>Thaumatomyia bistrigata</i> (Walker)	Diptera	Chloropidae
<i>Thaumatomyia glabra</i> Meigen	Diptera	Chloropidae
<i>Thereva duplicitis</i> Coquillett	Diptera	Therevidae
<i>Therioaphis maculata</i> (Buckton)	Homoptera	Aphididae
<i>Thrips tabaci</i> Lindeman	Thysanoptera	Thripidae
<i>Thyanta punctiventris</i> Van Duzee	Hemiptera	Pentatomidae
<i>Trichodes nutalli</i> Kirby	Coleoptera	Cleridae
<i>Trigonotylus coelestialium</i> (Kirkaldy)	Hemiptera	Miridae
<i>Trigonotylus ruficornis</i> (Geoffroy)	Hemiptera	Miridae
<i>Trirhabda attenuata</i> (Say)	Coleoptera	Chrysomelidae
<i>Trirhabda</i> nr <i>borealis</i> Blake	Coleoptera	Chrysomelidae
<i>Trirhabda virgata</i> LeConte	Coleoptera	Chrysomelidae
<i>Tychius picirostris</i> (Fabricius)	Coleoptera	Curculionidae
<i>Wesmaelia pendula</i> Foester	Hymenoptera	Braconidae
<i>Xylentinus fucatus</i> LeConte	Coleoptera	Anobiidae
<i>Xylocoris umbrinus</i> (Van Duzee)	Hemiptera	Miridae
<i>Xylocoris umbrinus</i> Van Duzee	Hemiptera	Anthocoridae
<i>Zeridoneus costalis</i> Van Duzee	Hemiptera	Lygaeidae

Appendix II. Species of Mites in Alfalfa

<i>Abrolophus</i> sp.	Acari	Erythraeidae
<i>Amblyseius iroquois</i> Chant and Hansell	Acari	Phytoseiidae
<i>Ameroseius corbicula</i> (Sowerby)	Acari	Ameroseiidae
<i>Biscirus silvaticus</i> (Kramer)	Acari	Bdellidae
<i>Cunaxoides biscutum</i> (Nesbitt)	Acari	Cunaxidae
<i>Oribatula tibialis</i> (Nicolet)	Acari	Oribatulidae
<i>Petrobia latens</i> (Muller)	Acari	Tetranychidae
<i>Tetranychus urticae</i> (Koch)	Acari	Tetranychidae
<i>Trombidium</i> sp.	Acari	Trombiidae

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